

REMARKS

As an initial matter, Applicants thank the Examiner for withdrawing the rejections set forth in the Office Action of January 27, 2010.

With entry of the present amendments, claims 21-37, 40 and 43-48 are pending. Claims 1-20 and 38-39 were previously cancelled; claims 41-42 are currently cancelled; claim 21 is amended; and claims 43-48 are added. No new matter has been added by way of amendment and support for the amended and new claims may be found throughout the application as originally filed. For example, support for the amendments and new claims may be found in at least page 10, lines 3-10; page 18, lines 1-4; Tables 1-2; and page 11, lines 22-23. Support is further discussed below as part of the discussion of the amendment to independent claim 21.

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

I. Independent claim 21

Independent claim 21 stands rejected under 35 U.S.C. § 103(a) for allegedly being unpatentable over U.S. Pat. No. 5,858,928 (Aubert), U.S. Pat. No. 4,528,039 (Rubin), U.S. Pat. No. 4,578,208 (Geke), U.S. Pat. No. 4,752,411 (Melin), or U.S. Pat. No. 5,259,960 (Beck). Applicants respectfully traverse.

Independent claim 21 has been amended to further characterize the claimed alkyleneoxy-alkyl phosphate di- or triester of formula I and the claimed corrosion inhibitor system to be used in the claimed process. Specifically, claim 21 has been amended to recite that “the alkyleneoxy-alkyl phosphate di- or triester of formula I is selected such that the corrosion inhibitor system reduces the corrosion rate of an aluminum surface subjected to the corrosion inhibitor system at a temperature of 60°C for 60 min by a factor of at least 300 as compared to an aluminum surface subjected to the corrosion inhibitor system without the selected alkyleneoxy-alkyl phosphate di- or triester of formula I under the same conditions.” Thus, claim 21 recites a process for treating specific metal surfaces (aluminum, colored metals or alloys thereof) under specific conditions (pH > 7.0, temperature from 0 to 80°C, and time from 10 s to 60 min) using specific phosphate di- or triester compounds, i.e., compounds that

provide a corrosion inhibitor system capable of achieving a specific result—the claimed reduction in corrosion rate.

This amendment clarifies that the claimed process is based, at least in part, on the inventors' discovery that the claimed compounds exhibit unexpectedly superior anticorrosive properties as compared to phosphate monoester compounds. These unexpectedly superior anticorrosive properties (disclosed in pages 14-20 of the application) have been discussed on pages 10-11 of Applicants Reply of 4/14/2010. Briefly, the data show that corrosion inhibitor systems including the claimed compounds are capable of reducing the corrosion rate of a variety of metals by factors of 3 to over 1000 more than corrosion inhibitor systems that do not include the claimed compounds. Similarly, these corrosion inhibitor systems are capable of reducing the corrosion rate of a variety of metals by similar factors as compared to corrosion inhibitor systems including various phosphate monoester compounds.

For the Office's convenience, a portion of the data is presented in the Table below. The data in the first column (taken from Table 2 of the application) shows the corrosion rate of an aluminum surface subjected to the corrosion inhibitor system at a temperature of 60°C for 60 min. Composition A (control) does not include any phosphate ester compound. Compositions B-F (comparative) include phosphate monoester compounds. Compositions G and H include the claimed compounds. The data in the second column (obtained by comparing the corrosion rate of the corrosion inhibitor system of composition A to the corrosion inhibitor system of compositions B-H) shows the factor by which the corrosion rate of the aluminum surface is reduced by the corrosion inhibitor system as compared to the same corrosion inhibitor system used under the same conditions but without any phosphate ester. The data shows that the claimed corrosion inhibitor systems including the claimed compounds are both vastly superior to corrosion inhibitor systems which do not include any phosphate ester compound as well as corrosion inhibitor systems which include a variety of phosphate monoester compounds. In particular, compositions G and H (including the claimed compounds) reduce the corrosion rate by a factor of 370 and 1111, respectively. By contrast, compositions B-F (including phosphate monoester compounds) are only able to reduce the corrosion rate by factors of 1 to 1.8.

Table. Corrosion Rates of Aluminum Subjected to the Corrosion Inhibitor Systems, Compositions A-H.

Corrosion Inhibitor System	Corrosion Rate (mm/year) measured at 60°C and 60 min	Reduction in Corrosion Rate as compared to Corrosion Inhibitor System without phosphate ester compound (Composition A)¹
Composition A (no phosphate ester)	33.32	—
Composition B (Triton H-66, phosphate monoester)	32.15	1
Composition C (Korantin SMK, phosphate monoester)	21.58	1.5
Composition D (Berol 522, phosphate monoester)	31.54	1.1
Composition E (Berol 725, phosphate monoester)	29.82	1.1
Composition F (Chimin F1, phosphate monoester)	18.79	1.8
Composition G (Phospholan PE65, phosphate diester)	0.09	370
Composition H (Maphos P54, phosphate diester)	0.03	1111

As further discussed below, the prior art simply fails to provide a basis from which those of ordinary skill in the art could have predicted that the claimed compounds would exhibit vastly superior anticorrosive properties as compared to phosphate monoester compounds. As

emphasized by the Supreme Court, even if one of ordinary skill in the art could have made a particular selection from among known elements, obviousness cannot be found unless the result of the selection was predictable. *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1396 (2007). Since the prior art fails to provide a basis for predicting the vastly superior anticorrosive properties of the claimed compounds, it cannot be considered obvious to use these compounds in the claimed process for treating metal surfaces to inhibit corrosion.

Applicants respectfully submit that each of the cited references—Aubert, Rubin, Geke, Melin and Beck—fail to provide a sufficient basis from which those of ordinary skill in the art could have predicted that the claimed compounds would exhibit vastly superior anticorrosive properties as compared to phosphate monoester compounds.

Regarding Aubert, Rubin, Melin and Beck, each of these references teach broad classes of phosphate mono- and/or diester compounds for use as surfactants in various compositions. None recognize any anticorrosive properties at all for the disclosed phosphate ester compounds. None provide any basis for inferring that a phosphate ester compound selected on the basis of its surfactant properties will inherently achieve the claimed reduction in corrosion rate (by a factor of at least 300). At most, by suggesting that the disclosed phosphate mono- and diester compounds are interchangeable, the prior art actually creates the expectation that the disclosed compounds should exhibit similar properties. That the claimed compounds actually exhibit vastly superior anticorrosive properties as compared to phosphate monoester compounds is a result that simply could not have been predicted based on these references. Accordingly, the references fail to render obvious the particular use for the claimed compounds recited in claim 21.

Regarding Geke, the reference also teaches broad classes of phosphate mono- and diester compounds. However, as far as Applicants have been able to determine, Geke does not disclose any specific phosphate diester compound. Instead, it discloses several specific phosphate monoester compounds. Examples. Moreover, Geke explicitly teaches a preference for these phosphate monoester compounds. In particular, Geke states:

Monoesters of phosphoric acid with ethoxylated, linear C₁₀-C₂₀ alkanols and their sodium, potassium, ammonium or alkanolamine salts are preferably used in the compositions of the invention. These esters are particularly advantageous in that, when used in the compositions of the invention in aqueous solution, no troublesome foam is

produced in spray systems, and this lack of foam results in uninterrupted operation in automatic cleaning machines. Since these ethoxylated, hydrophilic monoesters do not cause any precipitates of calcium or magnesium salts, even in hard water, no coatings which could give rise to corrosion are formed on the cleaned parts. In addition, any precipitates such as the above would result in an unnecessary and ineffectual consumption of the inhibitor which would make practical application virtually impossible. Accordingly, the inhibiting effect of the present compositions containing these monoesters is guaranteed, even in hard water. Col. 2 line 62 – col. 3, line 12.

Not only does Geke explicitly prefer phosphate monoester compounds since they do not produce “troublesome foam” and do not give rise to precipitates, but also Geke strongly suggests that these properties are a critical factor in selecting a phosphate ester compound since foam and precipitates “would make practical application [of the compositions] virtually impossible.” Col. 1, line 63 – col. 2, line 1 and col. 3, line 9.

At the most, Geke’s strong statements regarding phosphate monoester compounds and its numerous examples using phosphate monoester compounds would lead those of ordinary skill in the art to select a phosphate monoester compound over a phosphate diester compound. The teachings certainly do not provide those of ordinary skill in the art with a sufficient basis for predicting that the claimed compounds would exhibit the vastly superior anticorrosive properties the inventors have demonstrated. Accordingly, Geke fails to render obvious the particular selection of compounds recited in claim 21.

In summary, without a showing that the results of the claimed process would have been reasonably predictable by those of ordinary skill in the art, a conclusion of obviousness cannot stand. None of the cited references provides such a showing. For at least this reason, Applicants respectfully request that the rejection of claim 21, and any claims depending therefrom, be withdrawn.

Finally, Applicants provide a few additional comments regarding Aubert and Rubin. Regarding Aubert, this reference’s mere mention of a possible use of the disclosed compositions “as agents for the industrial cleaning of hard surfaces” provides an insufficient basis from which to conclude that it would be obvious to modify the compositions to optimize the selection of the phosphate diester compound to achieve the claimed result and then apply the compositions to metal surfaces under the claimed conditions. Aubert’s primary focus is the use of the disclosed compositions as drilling fluids for drilling through walls, concrete, sand, gravel, and soil. Title, Abstract, Examples. Aubert’s mere mention of a possible use as

cleaning agents is nothing more than the sort of “invitation to experiment” that the Federal Circuit has held does not amount to obviousness. (“Obvious to try” is erroneously equated with obviousness when what was “obvious to try” was to explore a new technology or general approach that seemed to be a promising field of experimentation, where the prior art gave only general guidance as to the particular form of the claimed invention or how to achieve it. *In re Kubin*, 561 F.3d 1351, 1359 (Fed. Cir. 2009).) In this case, not only does Aubert fail to provide any detail or guidance as to the use of its compositions as cleaning agents, but also Aubert says nothing about use of the compositions as corrosion inhibitors, nor does the reference provide any guidance as to how the compositions would have to be optimized to achieve such a use. For this additional reason, Applicants respectfully request that the rejection of claim 21, and any claims depending therefrom, be withdrawn.

Regarding Rubin, it cannot be considered obvious to modify Rubin’s compositions to optimize the selection of the phosphate ester compound based on its anticorrosive properties to achieve the claimed result. Rubin’s disclosed compositions purportedly solve the problem of corrosion through the synergistic combination of certain alkali metal metasilicates together with certain alkali metal carbonates or orthophosphates. Col. 1, lines 15-20. In fact, Rubin explicitly emphasizes the criticality of the synergistic combination. Col. 2, lines 3-5; col. 3, lines 4-9; col. 14, lines 12-14. Those of ordinary skill in the art would have no reason to undergo optimization of the selection of the phosphate compound to achieve a reduction in corrosion rate when other components in the compositions are already purported to solve the problem. Even if a reference could be modified, obviousness cannot be found without an objective reason to effect the modification. MPEP 2143.01 IV. Moreover, a modification that changes the principle of operation of a reference is not an obvious one. MPEP 2143.01 VI. For this additional reason, Applicants respectfully request that the rejection of claim 21, and any claims depending therefrom be withdrawn.

II. New Claims

New claims 43 and 44 depend from independent claim 21. For each of the reasons discussed above in support of the patentability of claim 21, Applicants respectfully submit that claims 43 and 44 are also patentable.

Like independent claim 21, new claims 45-47 also recite a process in which the alkyleneoxy-alkyl phosphate di- or triester of formula I is selected such that the corrosion inhibitor system reduces the corrosion rate of an aluminum surface subjected to the corrosion inhibitor system at a temperature of 60°C for 60 min by a factor of at least 300 as compared to an aluminum surface subjected to the corrosion inhibitor system without the selected alkyleneoxy-alkyl phosphate di- or triester of formula I under the same conditions. As discussed above with respect to claim 21, none of the prior art provides a sufficient basis from which those of ordinary skill in the art would have predicted that the claimed compounds would exhibit such vastly superior anticorrosive properties. Accordingly, Applicants submit that new claims 45-47 are also patentable over the prior art. In addition, claims 45-47 recite that the corrosion inhibitor system consists of each of the recited compounds. None of the prior art teaches or suggests a composition that includes only the recited compounds. For this additional reason, Applicants submit that these claims are patentable.

New claim 48 recites a process in which the corrosion inhibitor system comprises an alkyleneoxy-alkyl phosphate di- or triester of formula I and an anionic phosphate ester surfactant, wherein the alkyleneoxy-alkyl phosphate di- or triester of formula I and the anionic phosphate ester surfactant are different compounds. None of the references teach or suggest a composition that includes both compounds. In addition, those of ordinary skill in the art would have no reason to modify the compositions of Rubin, Beck, Aubert and Melin to include an alkyleneoxy-alkyl phosphate di- or triester of formula I in addition to the anionic phosphate ester surfactants they already disclose. Similarly, those of ordinary skill in the art would have no reason to modify the compositions of Geke to replace the “sprayable, nonionic surfactant” it discloses with an anionic phosphate ester surfactant, since the nonionic surfactant is present to “ensure that the solution can be used and sprayed at any desired process temperature without troublesome foaming,” since Geke teaches that it is critical to avoid foaming and since the disclosed nonionic surfactant is already serving the purpose of providing a surfactant. Col. 3, lines 31-34. For each of these reasons, Applicants respectfully submit that claim 48 is patentable.

Applicants believe that the present application is in condition for allowance. Favorable reconsideration of the application is respectfully requested. The Examiner is invited to contact

the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 50-5254. Should no proper payment be enclosed herewith, as by a credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 50-5254. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 50-5254.

Respectfully submitted,

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